REMARKS

Claims 3-18 are active in the application.

Claim 3 has been amended to make it clearer and to more accurately describe the present invention. Particularly, steps newly labeled a), b), c), and d) are understood to comprise the "representing" step. No other steps comprise the representing step. The "modeling" step description has been clarified.

Claim 3 has also been amended to specify that the partial evaluation is performed with respect to user input. This new limitation is supported in the specification at page 9, lines 24-26, and throughout the specification.

Claims 13-18 have been added.

Claim 13 requires that the program is partially evaluated and simplified, and that the information space is provided to the user after every interaction. Every time the user provides dialog to the computer, the computer partially evaluates the received dialog, simplifies the program, and then provides a modified information space (e.g. webpage) to the user. This aspect of the invention is taught in the examples described in pages 19-24, and shown in Fig. 11, which illustrates that partial evaluation is repeatedly performed.

New claims 14-16 are supported throughout the specification and by the claims as originally filed. For example, claims 15 and 16 are supported by Fig. 11, which illustrates that partial evaluation is repeatedly performed.

No new matter is present in claims 13-18.

Claim 3 was rejected under 35 USC 112, second paragraph, as being incomplete for omitting essential steps. Specifically, the office action argues that there is no assurance in claim 3 that there is realized dialog between the user and the information system. With the clarifying amendments to claim 3, it should now be clear that dialog between the user and information system is specifically set forth in claim 3. For example, claim 3 as amended states the following: "each interaction sequence denotes a dialog between the user and the information system". Also, the partial evaluation is performed with respect to the user input (dialog). Clearly, this language of claim 3 ensures dialog between the user and the information system.

Claims 3-12 were rejected under 35 USC 103(a) as being unpatentable

over US Patent publication 2001/0049688 to Fratkina et al. in view of US Patent 5,805,894 to Robison. These rejections are traversed.

As noted in the prior response, the present invention provides a method for user interaction with a computer. In the present invention, the user can provide responses or dialog to the computer out-of-turn (i.e., the provided dialog input can be unrelated to a query posed by the computer.). Out-of-turn interaction is a form of interaction between a human user and computer that allows the user to provide un-requested information to the computer. Any out-of-turn dialog provided to the computer will be used by partial evaluation to simplify a program that models the user-computer interaction. In this way, personalized information can be provided to the user in a rapid and convenient fashion. In the present invention, the user is not restricted to answering questions posed by the computer.

For example, a user browsing a conventional website (i.e., a website functioning according to conventional methods that do not use the present invention) looking for a car might be required to enter a year or model number of a particular car. Responding to this request for information might be a nuisance and a waste of time if the user is really interested in all cars that are available with a green color, or with 4-wheel drive. In the present invention, the computer accepts dialog input out-of-turn so that the user could specify "green" or "4-wheel drive" even when the computer is expecting a response to its request for year or model number. In the present invention, the modeled computer program is partially evaluated with respect to "green" or "4-wheel drive" dialog input, and used to provide the user with personalized information, such as a webpage that omits all cars that are not available in green or not available with 4-wheel drive. Partial evaluation of user dialog is therefore essential in the invention. Partial evaluation is used to simplify the operating computer program (i.e. the computer program that models the interaction), so that personalized information is provided to the user.

Significantly in the invention, partial evaluation allows for out-of-turn inputs by the user. The user can provide "off-topic" (i.e. unrequested) dialog to the computer at any time. The interaction is thereby mixed-initiative, which means that both the user and the computer can initiate a request for information. While partial evaluation is known in the art for simplifying code (e.g. removing

redundancies and unreachable portions of a program), it is novel, unobvious, and therefore patentable to use partial evaluation to facilitate the valuable and unexpected feature of mixed-initiative interaction.

The ability to handle out of turn user dialog is specifically required in claims 3 and 14. Claim 3 states that "interaction sequences can be initiated by the user out-of-turn", and claim 14 states that "dialog input is permitted to be out-of-turn". Out of turn dialog capability is possible because partial evaluation is performed with respect to the user input dialog. Partial evaluation with respect to user input dialog is also specifically required in both claims 3 and 14.

Fratkina et al., by comparison, teaches a user-computer interaction methodology in which: 1) there is no mixed-initiative or out-of-turn interaction, 2) use of partial evaluation is not suggested or motivated, and 3) the users input is constrained by queries posed by the computer (Fratkina et al. require multiple choice input). Additionally, the combination of Fratkina et al. and Robison will not produce the present invention as claimed (which requires partial evaluation with respect to user input).

Fratkina et al. teach a methodology for computer-user interaction that retrieves information from a knowledge map. A query is received from a user, and the query is used by the computer to identify one of a listed number of knowledge maps. Each knowledge map has many choices (nodes) arranged in a "dialog state". With every response received by the user, the dialog state is modified according to the choice made by the user. The computer program can modify the dialog state in many ways according to answers to questions posed by the computer. For example, as illustrated in Fig. 12, the computer can ask the user if the user is on a special diet, and accordingly suggest pancakes for breakfast if the user is vegetarian. The interaction sequence of Fig. 12 is not out-of-turn or mixed initiative interaction since the user is responding to the computer-posed query "Are you on any diet".

It is important to note that, in Fratkina et al., inputs by the user are in response to queries from the computer. This is illustrated in Fig. 11 & paragraph 0291, Fig. 12, Fig. 18 & paragraph 0383, Fig. 19 & paragraph 384, and Fig. 20 & paragraph. In Figs. 11, 12, 19, and 20 the user is always responding to requests for information by the computer. For example, paragraph 0291 states: "As shown in

FIG. 11, the subsequent selection of a new concept node by dialog engine 232 proceeds as the user answers questions posed by the dialog engine." The goal of Fratkina et al. is to find the most detailed node sought by the user. Fratkina et al is able to analyze user-supplied information in creative ways (e.g. as illustrated by eliminating "eggs" from the choices available to a vegetarian in Fig. 12), but the user is always constrained to answer the questions posed by the computer. This aspect of Fratkina et al. is also illustrated in Fig. 18, which shows a flow chart. Initially in Fig. 18, the user can pose a question to the computer, but this freedom is limited to the very first step, and does not constitute out-of-turn input. (All computer-human interactions require the human to take the first step---e.g., when using the Google search engine, the user must type something in the search box for the interaction to begin, or more fundamentally the user must have decided to approach Google for his information needs---and hence such capability is not classified as out-of-turn interaction). After the computer/dialog engine performs the step of creating "initial goals" (step 1820), the user is trapped in a loop of answering questions posed by the computer. Paragraph 0383 states: "The application screen poses the questions to the user and based on the user's response returns nodes back to the dialog engine to begin the next iteration." Hence, in Fratkina et al. the user cannot pose queries to the computer, and can particularly never do so in a manner that is out-of-turn. The user cannot send off-topic or out-of-turn replies to the computer. The computer does not perform any analysis or evaluation of user input that is not responsive to the query posed by the computer. The computer of Fratkina et al. is incapable of receiving or analyzing nonresponsive, or "out-of-turn" dialog provided by the user. For example, there is no way for the computer of Fratkina et al. to receive or analyze a response of "ham sandwich" or "dinner menu" in response to the question "Are you on any diet?". The present invention can easily analyze this kind of out-of-turn response at any time. The computer of Fratkina et al. can only receive and analyze a response that matches a preprogrammed answer to a query (as represented in a node such as the nodes illustrated in Fig. 20).

In the methodology of Fratkina et al. there is no possibility for out-of-turn off-topic or mixed initiative interaction, as required in the present invention. In Fratkina et al. the choices available to the user at any iteration (except the first

iteration) is limited by the choices programmed into the computer. The methodology of Fratkina et al. relies on a series of forced choices dictated by the computer, and, hence, Fratkina et al. is very different from the present invention as claimed.

Hence, Fratkina et al. does not meet the limitations of claim 3 requiring that the user can initiate interaction sequences out-of-turn.

Additionally, Fratkina et al. does not meet the limitations of claim 3 requiring structural aspects specified by the user. Structural aspects specified by the user correspond to either in-turn or out-of-turn queries that are evaluated by the computer in the present invention. Fratkina et al. does not teach or suggest this possibility.

Also, there is no suggestion or motivation to employ partial evaluation in the methodology of Fratkina et al.Frakina et al. teach that a dialog state is modified to indicate answers provided by the user. The queries posed by the computer are always multiple choice, and always require an answer selected from among a predetermined list of answers. Accordingly, there is no conceivable use for partial evaluation in Frakina et al. Partial evaluation is a powerful software technique that is completely unnecessary for analyzing the simple choice selections contemplated in Fratkina et al. Partial evaluation is typically designed to eliminate redundant code or code that can result in logically inconsistent or impossible outcomes. No such outcomes are possible in Fratkina et al., since all the choices available to the user are listed and predefined by the computer. Hence, there is no motivation to use partial evaluation in Fratkina et al.

Moreover, the combination proposed in the Office Action will not produce the invention as claimed in either of the independent claims. Both independent claims 3 and 14 require partial evaluation of user dialog, simplification of the computer program consequent to the partial evaluation, and then presentation of an information space based on the simplified program. In this way, the computer program is responsive to out-of-turn user input. Partial evaluation is performed on user input while the interaction is proceeding, and used to simplify the program multiple times during the interaction, rather than before.

Robison, by comparison, teaches that partial evaluation is performed before or during program compiling, such that redundant section of code (i.e. code

corresponding to "unreachable edges') can be forever eliminated. In this way, the code is "cleaned up" so that it is logically self consistent and more stable and efficient. After compiling, the partial evaluation is never performed again. Partial evaluation is not performed on a program while the interaction is proceeding, and is not performed on user input or any kind of user interaction. Any conceivable combination of Fratkina et al. and Robison, will result in a user-interaction program that has been processed according to Robison (i.e. a single partial evaluation during program compilation) during the "representing" step. In other words, it will result in a "cleaned up" and more stable version of what is taught in Fratkina et al. And the teachings of Fratkina et al. are very different from the present invention because out-of-turn interaction is not possible. Combining Fratkina et al. with Robison will not provide partial evaluation of user input (dialog) in Fratkina et al. and will not provide out-of-turn interaction capability. For this additional reason, the rejections of the claims must be withdrawn.

Another important difference between the present invention and Robison is that Robison necessarily employs partial evaluation only once, during program compilation. By comparison, in the present invention, partial evaluation is performed every time user input is provided. In the present invention, the program is partially evaluated multiple times based on the user input. This aspect of the invention is reflected in language requiring partial evaluation with respect to user input or dialog input.

Regarding claim 8, neither Fratkina et al nor Robison teach or suggest a partial input specification window.

Regarding claim 10, neither Fratkina et al. nor Robison teach or suggest that the user interface can comprise two windows, with one window allowing computer-initiated interaction, and a second window allowing user-initiated, out-of-turn interacation that is partially evaluated.

Regarding claim 11, neither Fratkina et al nor Robison teach or suggest that the user can specify any aspect out-of-turn, and that the out-of-turn structural variables are partially evaluated. Fratkina et al. does not allow out-of-turn interaction in which the user provides off-topic responses to computer queries.

Regarding claim 12, neither Fratkina et al nor Robison teach or suggest performing partial evaluation with respect to the structural program variables that

represent information-seeking aspects. Neither Fratkina et al., nor Robison suggest that partial evaluation can be used to analyze structural program variables provided by a user.

In view of the foregoing, it is respectfully requested that the application be reconsidered, that claims 3-15 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

A provisional petition is hereby made for any extension of time necessary for the continued pendency during the life of this application. Please charge any fees for such provisional petition and any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,

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